

Docket No: H1542**Serial No. 10/727,393****REMARKS**

Upon entry of the present Reply, claims 1-20 are pending in the application. Claims 1, 8 and 11 are amended herein. The amendment of the claims is supported in the claims as filed (claim 8, removably mounted diffuser; claims 11 and 18, removal and replacement of diffuser for determination of reflection lens pupil transmission distribution), and at page 11, lines 2-5 (amended claim 8) .

For at least the reasons which follow and based on the foregoing claims, Applicants respectfully request reconsideration of the application, withdrawal of the asserted objections and rejections, and allowance of the claims.

Rejection of Claims under 35 U.S.C. §§ 102(e) and/or 103(a) over Naulleau

Claims 1, 2, 4-10, 12 and 14-20 stand rejected as anticipated by Naulleau, U.S. Patent No. 6,927,887 B2. Claims 3, 11 and 13 stand rejected as obvious over Naulleau. Applicants respectfully submit that all of these rejections either are rendered moot by the amendments and/or fail *ab initio* to state a *prima facie* case of either anticipation or obviousness. Applicants respectfully submit that all of the presently pending claims patentably distinguish over Naulleau. Applicants respectfully request the Examiner to withdraw the rejections of all of the pending claims.

Specifically, Naulleau fails to disclose or suggest that the diffuser is removable as set forth in independent claims 1, 11 and 18, fails to disclose or suggest the presently claimed method of operating the device both with and without the diffuser in place in order to obtain the pupil lens distributions with the diffuser in place and with the diffuser removed, to compare the first and the second pupil intensity distributions to determine intensity distribution of radiation emanating from the illumination source and the lens system as in claims 11 and 18, and fails to disclose or suggest determining the pupil lens distributions having the relationships set forth in claim 18. Accordingly, the presently claimed invention is neither

Docket No: H1542**Serial No. 10/727,393**

anticipated nor would have been obvious over either of the cited references or any combination thereof. Accordingly, Applicants respectfully request the Examiner to withdraw the rejection of these claims on this ground.

More specifically, Naulleau fails to disclose that the diffuser is removable. The closest that Naulleau comes to a removable diffuser is by disclosing a movable diffuser. Because the diffuser is moveable in two directions does not disclose or even suggest that it might be removable of that the device might or even possibly could be operated in the absence of the diffuser for any purpose. For this reason alone, none of the claims are anticipated by Naulleau.

Naulleau also fails to disclose or even suggest that the device could be operated with the diffuser for normal operation and without the diffuser for determination of reflection lens pupil transmission distribution, as claimed in claims 1, 11 and 18.

Naulleau further fails to disclose or even suggest that a method could be carried out to determine pupil lens distributions with and without the removable diffuser in place and the information thus obtained to determine the intensity distribution of radiation emanating from the illumination source and the lens system, as claimed in claim 11.

Naulleau further fails to disclose or even suggest that a method could be carried out to determine a first pupil intensity distribution $P_{(x,y) \text{ no diffuser}}$, a second pupil intensity distribution $P_{(x,y) \text{ diffuser}}$, and to determine the following relationships:

$$P_{(x,y) \text{ diffuser}} \cong P_{(x,y) \text{ reflective lens}} \quad (1)$$

and

$$P_{(x,y) \text{ diffuser}} / P_{(x,y) \text{ no diffuser}} \cong P_{(x,y) \text{ illumination source}} \quad (2), \text{ as set forth}$$

in claim 18 and the claims dependent thereon.

Original claim 8 included the feature that the diffuser be removably mounted. The Examiner referred to Fig. 1 and col. 7, lines 4-5 in support of the rejection of claim 8. There is simply no disclosure at these locations and, to Applicants'

Docket No: H1542**Serial No. 10/727,393**

knowledge, no disclosure anywhere else in Naulleau that the diffuser is removable. As noted above, it is movable, but movable is not removable.

The Examiner's reference to Figs. 1 and Fig. and col. 7, line 41-46 cannot possibly state a *prima facie* case of anticipation of claim 18. There is simply no disclosure in Fig. 1, Fig. 2 or at col. 7, line 41-46 that even arguably discloses the elements of the claimed invention of claim 18 as contended by the Examiner.

The Examiner also referred to Fig. 1 and col. 7, lines 41-46 in support of the rejection of claim 11. The Examiner is mistaken and this statement is clearly erroneous - there is no such disclosure in Naulleau. The Examiner admitted that Naulleau is silent regarding intensity measuring device for comparing the first and the second pupil to determine intensity distribution of radiation emanating from the illumination source and the lens system. The Examiner contended, with no basis in fact and no citation to any relevant suggestion, that it would have been obvious to measure and compare the intensity of the light measured at the two distances to determine the distortion of the reflective surface.

This contention is clearly erroneous for several reasons. First, foremost and most importantly, this is not what the claimed invention does. The claimed invention is not measuring and comparing the light intensity at two distances. The claimed invention is measuring and comparing the light intensity with and without the diffuser in place, to determine the respective contributions to variations in the observed pupil intensity from the illumination system and from the lens system.

The second reason this contention is clearly erroneous is that Naulleau makes no mention of determining the distortion of the reflective surface by any method.

The third reason this contention is clearly erroneous is that it is based on nothing more than hindsight reconstruction of Applicants' invention. There is nothing in Naulleau or in any other source cited by or even suggested by the Examiner as providing a suggestion or motivation to do what Applicants have done

Docket No: H1542**Serial No. 10/727,393**

in the claimed invention - to devise a method and a device whereby the respective contributions to variations in the observed pupil intensity from the illumination system and from the lens system can be determined.

Regarding claims 9 and 10, there has been no *prima facie* case of anticipation stated with respect to these claims even when dependent upon original claim 1. The mere reference, without more, to Fig. 1 cannot state a *prima facie* case of anticipation. Fig. 1 of Naulleau does not show that the image plane is substantially coplanar with a focal plane of light from the lens system and the reflective mask layer is offset from a focal plane of light from the illumination source. If the Examiner intends to persist in this position, then Applicants respectfully request the Examiner to state facts in support of this contention. Otherwise, Applicants submit that there is no ground for this contention, and the rejection of these claims must be withdrawn.

Regarding claim 14, there has been no *prima facie* case of anticipation stated with respect to this claim even when dependent upon original claim 1. The Examiner cited col. 3, lines 36-47 in support of the contention that Naulleau discloses wherein use of the diffuser decouples contributions to the second pupil image arising from the illumination source aperture uniformity from contributions rising from the lens system. Applicants respectfully submit that the cited disclosure at no point makes any such statement. All the cited disclosure states is that the diffuser renders incoherent the beam of coherent radiation originally incident thereon. While it is possible that the diffuser of Naulleau could perform the claimed function if the device was operated as claimed without the diffuser mounted, there is nothing in the cited portion of Naulleau so stating or even so suggesting. If the Examiner intends to persist in this position, then Applicants respectfully request the Examiner to state facts in support of this contention. Otherwise, Applicants submit that there is no ground for this contention, and the rejection of this claim must be withdrawn.

Docket No: H1542**Serial No. 10/727,393**

Regarding claims 15 and 16, similar considerations apply as to claims 9, 10 and 14. For claim 15, the Examiner contends that Naulleau discloses wherein the first pupil intensity distribution substantially corresponds to combined effects of illumination source 12 intensity distribution and lens system pupil transmission distribution, citing Fig. 1 and col. 4, line 65 to col. 5, line 3 in support. For claim 16, the Examiner contends that Naulleau discloses wherein the second pupil intensity distribution substantially corresponds to lens (14/16/10/11/18/60/62) system pupil distribution, citing only Fig. 1 in support. Applicants respectfully submit that the mere reference to Fig. 1 and the brief disclosure cited cannot state a *prima facie* case of anticipation of claims 15 and 16, even as dependent on original claim 11. The facts are that Naulleau at no time discloses or suggests operation without the diffuser, that Naulleau at no time discloses or suggests there is any first and second pupil lens distribution, that Naulleau at no time discloses or suggests that any first and second pupil lens distribution should be measured with and without the diffuser in place, and Naulleau at no time discloses or suggests that any first and second pupil lens distribution should be measured with and without the diffuser in place and that these pupil lens distributions be compared to determine intensity distribution of radiation emanating from the illumination source and the lens system, as claimed. If the Examiner intends to persist in this position, then Applicants respectfully request the Examiner to state facts in support of this contention. Otherwise, Applicants submit that there is no ground for this contention, and the rejection of these claims must be withdrawn.

Finally, regarding the alleged obviousness of claims 3 and 13, the Examiner relies upon the allegation that "applicant discloses (fig. 1)(Page 12, line 20-Page 13, line 1-2) that this is a well known". The Examiner's statement is clearly erroneous. Applicants made no such statement. In order to make clear what Applicants actually stated, the full disclosure cited by the Examiner is repeated here:

Docket No: H1542**Serial No. 10/727,393**

Referring still to Figs. 3-7, a more detailed description of the operation of the devices 100-500 is provided, with differences noted. In each of Figs. 3-7, the mask 30 is shown similar to the conventional EUV mask shown in Fig. 2. As noted above, the present invention is not limited to EUV systems, but is generally applicable to any reflective mask and wafer exposure system. Thus, the pattern 48 in each mask 30 is formed by individual reflective elements similar to the reflective elements 14' shown in Fig. 2. It will be understood that the present invention is not limited to this embodiment, and a reflective mask such as that shown in Fig. 1 may be used as well and to equal effect. The difference is that the mask 10' in Fig. 2 forms a pattern of bright spots or pupil images 50, while the mask 10 shown in Fig. 1 forms a pattern of dark spots or pupil images 50 corresponding to the light-absorbing or non-reflecting areas 16.

There is no admission here as contended by the Examiner. All that this disclosure says regarding the mask is that a mask forming either bright spots or dark spots can be used, and that such masks are known. It does not say and cannot be reasonably construed to say that "the light-reflecting areas or the non-reflecting areas in the reflective mask layer have a substantially same predetermined size and shape and are spaced apart from one another so that overlap between the pupil images at the image plane is avoided while measuring intensity and/or uniformity of the pupil images is enabled", as claimed in claims 3 and 13.

Accordingly, Applicants respectfully submit that the Examiner has failed to state a *prima facie* case of obviousness of claims 3 and 13, even as these claims were submitted prior to the amendment of claims 1 and 11, upon which the rejected claims depend. Applicants request the Examiner to withdraw the rejections of these claims.

In summary, there is simply nothing in Naulleau to suggest that the diffuser could be removed or that the disclosed device could even possibly be operated with the diffuser removed, as set forth in claims 1, 11 and 18. There is simply nothing in Naulleau to suggest that the diffuser could be removed and the system operated as set forth in claims 11 and 18 to determine the respective contributions to

Docket No: H1542**Serial No. 10/727,393**

variations in the observed pupil intensity from the illumination system and from the lens system.

CONCLUSION

For the foregoing reasons, Applicants respectfully submit that all of the presently pending claims patentably distinguish over the prior art generally, and over Naulleau in particular, and that all of Applicants' claims are therefore in condition for allowance. Applicants request the Examiner to so indicate.

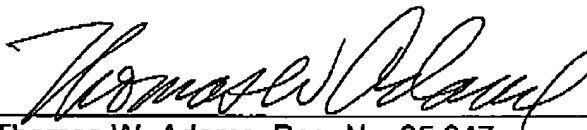
If the Examiner considers that a telephone interview would be helpful to facilitate favorable prosecution of this application, the Examiner is invited to telephone the undersigned.

If any additional fees are required for the filing of this paper, please charge the fee to Deposit Account No. 18-0988, Order No. H1542 (AMDSPH1542US).

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

DATE: December 28, 2005



Thomas W. Adams, Reg. No. 35,047

1621 Euclid Avenue
Nineteenth Floor
Cleveland, Ohio 44115
Ph: (216) 621-1113
Fax: (216) 621-6165

B:\Adams-Tom\Client Files\AMD\PH1542\AMDH1542 ROA1.wpd